Barriers to importation of plant germplasm

developed for
Industry members of GERMAC

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1. Executive Summary

The Germplasm Advisory Committee (GERMAC) has commissioned a review of the barriers facing importation of plant germplasm. The review is restricted to a consideration of issues relating to species that are already present in New Zealand and is intended to be complimentary to the 2006 report by the Plant Imports Action Group on "Barriers to Importation of New Plant Species".

The report is informed by survey responses from 43 industry respondents covering experiences with importation of 51 crops. The value of the industries contributing to the report is $7.8 billion. Survey respondents were asked to provide feedback on barriers associated with the development of new Import Health Standards (IHSs), existing IHSs, Post Entry Quarantine facilities and Offshore Quarantine Facilities.

Three key impact areas are identified from barriers to importing plant germplasm – the inability to import, restricted import programmes and biosecurity risks from smuggled plant material. The barriers causing these impacts can be improved with more resources that are efficiently used and the use of new testing technologies.

The report identified four key areas where recommendations on improving access to germplasm should be made. These are resourcing/efficiency improvements, regulatory/policy improvement, management systems and technology.

Recommendations

Resourcing/efficiency improvements

- Raise the profile within MPI and the wider political environment of the importance of access to new germplasm to growing New Zealand's economy
- Prioritise the development and implementation of faster, more efficient systems and processes for IHS development and amendments.
- Review the resourcing and resource management in the Plant & Forestry team to ensure it is adequate to remove barriers to importation of plant material over a reasonable timeframe.
- Ensure that risk assessments for germplasm are prioritised as a matter of urgency.
- Review the work allocation within the Plant & Forestry team and ensure some staff have primary responsibility for updating IHSs and are not distracted by other issues.
- Incorporate the outcomes of the 2012 PEQ cost review into the outcomes from this report focussing on reducing time in PEQ and considering options for reducing audit/inspection regimes for proven facilities.

Regulatory/Policy Improvement

- Clarify the legal position of IHSs, import permits and the testing manual.
- Where an IHS is out of date, suspend or revoke it – do not leave it as current in the IHS and just not issue permits.
- Develop an anti-smuggling policy that specifically recognises the risks from having a germplasm importation system that is expensive and time consuming.
- Improve communication around the IHS development prioritisation system
- Develop and implement a policy for externally developed IHSs

- Consider whether lower risk pathways such as tissue culture imports could be prioritised and streamlined.
- Review the GERMAC Testing Technologies Proposal (2011) and incorporate proposed outcomes from this work into the GERAMC workplan.
- Consider suggestions on options for reducing the period plants must be in high level quarantine – these may include whether molecular testing could replace woody indexing in some cases, with the addition of a lower level quarantine observation period.
- Undertake a review of the systems for offshore facility approval and identify areas where the process can be streamlined. Consider having staff dedicated to this work area.
- Obtain clarification from EPA on the application of the HSNO Act to endophytes and hybrids. Consider whether this advice will enhance barriers to importation of germplasm.

Management Systems

- Develop a more defined process of prioritising work programmes for IHS work and offshore quarantine facility accreditation and extend it as far as necessary to provide a date for every project – 12 months is not sufficient. Ensure the workplan for the year is achievable and structure resourcing to ensure outcomes are achieved. Clearly communicate the prioritisation workplan to those who have requested work be undertaken. Ensure that any changes in the workplan use the same prioritisation process and are clearly communicated.
- Implement a procedure for reviewing high value IHSs on a regular basis to identify issues before they require the suspension of the IHS.
- Review efficiency of work allocation systems in use to ensure that limited resources are being used to achieve greatest impact.

Technology

- Ensure that MPI is contributing to international discussions on potential new testing technologies.
- Industry and MPI should continue to review and invest in research of to support new testing systems and technologies including initiatives to ensure pest free status of imported material.
- Assess the tissue culture pathway to determine how this technique inherently manages some pest risks. Consider assessing tissue culture imports as a separate pathway if this will allow fast development of IHSs.

2. Introduction

Established in 2010, the Germplasm Advisory Committee (GERMAC) is the consultative forum between the plant germplasm import industry groups, and the Ministry for Primary Industries (MPI). GERMAC works collaboratively to foster open communication between the industry, MPI and key agencies in the regulatory models for plant germplasm imports. The committee provides input into strategic direction, policy formulation, priority setting and the cost-effective delivery of the germplasm import programme. GERMAC also helps establish industry strategy, policy, standards, specifications and codes of practice based on industry consultation and advice regarding the limits of legislation to decision-making bodies.

At the March meeting of GERMAC there was considerable discussion about the need to specify what barriers are faced by importers of germplasm and the need to quantify the economic impact these barriers have. GERMAC members felt that in order to advocate for greater priority and resources to address these issues, there needed to be a report written that could be provided to regulators and funding agencies. A similar report was initiated in 2006 by the Plant Imports Action Group who presented a position paper on "Barriers to Importation of New Plant Species" to regulators and the Primary Production Select Committee. This report was successful in gaining recognition of the issues and stimulated work to resolve some of the issues identified.

This report is the outcome from the GERMAC initiated review of the barriers to importation of plant germplasm focussing on issues associated with importing germplasm of species already present in New Zealand.

GERMAC notes that maintaining New Zealand's biosecurity remains the first priority and should not be compromised in the process of facilitating plant germplasm imports. Under the new Government Industry Agreement (GIA) system for response and readiness, industry has influence across the biosecurity system and will be focussing on the plant germplasm import pathway to ensure risks are managed. Improvements in the plant germplasm import pathway must be undertaken while ensuring biosecurity risk is appropriately managed.

3. Survey

3.1. Survey Design

A basic survey was developed to gain feedback from industry on their issues associated with importation of germplasm (Appendix 1). The survey was focussed on three key areas:

- Import Health Standards
- Offshore quarantine facilities
- Post entry quarantine

GERMAC members were asked to circulate the survey widely and responses were either collated by a GERMAC member or sent directly to the report author. GERMAC members include representation from the following groups:

- Horticulture New Zealand
- Nursery and Garden Industry Assoc
- NZ Flower Growers Assoc
- NZ Grain and Seed Trade Assoc
- NZ Winegrowers
- Pipfruit New Zealand
- Zespri
- Crown Research Institutes (represented by Plant & Food Research)
- Ministry for Primary Industries
- Environmental Protection Authority

Survey responses were received in June 2014 from 43 individuals covering 51 crops as outlined in Table 1.

Table 1: Summary of responses to germplasm survey received

Industry	Number of responses	Industry value ($m)
Fruit		
Apples	4	530*
Blackcurrant	3	6
Citrus	3	53
Grape (wine)	2	1,202*
Kiwiberry	1	2
Kiwifruit	3	934*
Pears	4	9
Strawberry	1	26
Summerfruit	4	81
Potato	3	110
Hops	3	15
Seed	7	150
Nursery Production	11	306
Tree nuts	2	4
Forestry	1	4,500*
TOTAL	**51**	**7,928**

* value of exports only

3.2. Feedback Received

Feedback on the barriers faced by importers of plant germplasm was received across a number of topics that can be broadly categorised into the following areas and are summarised in the following sections:

- Import Health Standard Development
- Offshore quarantine
- Onshore quarantine
- Testing requirements
- Border clearance issues
- Other biosecurity issues

- HSNO Act issues

3.2.1. Import Health Standards

Concerns raised by importers in the area of Import Health Standards included:

- No import health standard exists - therefore imports are not possible. The majority of the responses in this area were from the ornamental industry. In general, they have not submitted a request for IHS development because they have been advised it will take too long even if they agree to pay for it and the cost of paying for the IHS development will be too expensive.
- MPI does not have a set policy for cost recovered IHS development. Costs and timeframes are in fact unknown.
- Importers question why it is so difficult to add new countries to an existing IHS for tissue culture e.g. adding South Africa to the IHS for Geranium tissue culture.
- Importers questioned the intensive requirements for tissue culture given that many seeds can be imported without any control.
- Other participants noted that some pathways (such as sterile tissue culture) are significantly lower risk then importation of plant material and should be given higher priority for IHS development.
- Some importers in the ornamental industry feel that the requirements for tissue culture are too intense.
- Several survey respondents indicated that they consider seed import requirements to be overly restrictive given that seeds are imported as part of the fresh produce pathway without restriction e.g. apples and pears.
- The kiwiberry industry noted some confusion over the suspension of the Actinidia IHS. While they are aware the IHS was suspended and they know the reason for this, there has been no communication on how MPI plans to update the IHS or whether the revised IHS will include requirements for kiwiberry in addition to kiwifruit. MPI have a working group for the kiwifruit IHS review but it would appear that kiwiberry are unaware of this.
- Some IHSs specify treatments that are no longer available or not considered best practice and there is no process for updating the treatment requirements.
- The ornamental industry has issues with treatment schedules that are out of date.
- Some industries noted concerns that while they have a current IHS at present and can import, the next time they apply for a permit, MPI might not issue one citing new pest risks.
- Importers were concerned that MPI does not have a system for regular review of IHSs.

3.2.2. Offshore quarantine

Concerns raised by importers in the area of offshore quarantine were:

- MPI requires testing and treatments that are not available in offshore facilities
- Some tests that have been completed offshore are required by MPI to be repeated in NZ quarantine.
- The requirement for woody indexing is expensive and time consuming. In some cases, they note that molecular testing is available and that it is not necessary to undertake woody indexing.
- The cost of reaccrediting the facilities was identified as a barrier.

- The requirement for industry to fund accreditation/reaccreditation of offshore facilities is considered unfair (if they pay for the approval, there is no restriction on who can use the facility and their competitors could access it for free)
- Several respondents considered that offshore accreditation should be a crown funded activity, or at least a shared activity.
- The reaccreditation process is also viewed as costly and time consuming by the facilities themselves.
- The hop industry noted that while they probably could benefit from the approval of an offshore quarantine facility, they cannot start that process until they have a valid IHS.

3.2.3. Post Entry quarantine

The key issues for those operating PEQ facilities were:

- Requirement for importation of seed into post entry quarantine were identified in several crops as being cost prohibitive.
- Requirement for woody indexing – several facilities felt that the requirement to complete woody indexing was increasing both the time and cost of the PEQ period. It also extends the minimum quarantine period significantly and introduces a level of uncertainty to the likely timeframes and costs of PEQ. Several operators felt that woody indexing should be replaced by molecular testing and if necessary, a period of observation in lower level quarantine. This would allow bulking and plant production to occur while the final quarantine clearance was given.
- Requirement to inspect plants – this was considered overly intensive and costly. One respondent indicated that twice weekly inspections for a 3 year period were not justified, were expensive and did not add to risk management.
- Need for innovation in testing – the time required in quarantine to complete all the testing and observation is the biggest concern to industries. They felt that it was critical that work on identifying, validating and implementing new technologies for quarantine pest detection was undertaken.
- Testing on bulked samples – several respondents felt that work on testing bulked samples would have significant advantages. This is particularly true of seed and tissue culture imports.
- Retesting of plants already tested offshore – a number of respondents felt that tests were being undertaken onshore in NZ that had already been undertaken in the offshore facility. This is inefficient and costly.
- Some PEQ operators noted that MPI make constant changes to the facility requirements and for each change, it needs to be documented and approved. Each change imposes more cost in the system.
- Most facilities noted that there were not enough inspectors and they often had to travel significant distances. This means that in some cases, facilities have to pay travel costs for an inspector in addition to inspection costs.
- Some noted a lack of knowledge by inspectors in how to take samples and delays between sending the results for analysis and obtaining the results.

3.2.4. Border

Respondents from both the ornamental and horticultural industries noted issues with clearance of sensitive shipments at the border. The issue appears to be of particular concern with tissue culture where storage conditions are important. Respondents noted concerns that when shipments arrive and are awaiting clearance that they

are stored incorrectly, or that delays in clearing the shipments negatively impacts on the quality of the tissue culture, in some cases destroying the viability before it is released. In other situations, respondents noted that because budwood is imported as dormant material, where the material was not stored correctly, dormancy can be broken at the facility while waiting for clearance.

Seed companies report difficulties in importing seed into New Zealand that was originally grown here and then exported. The issue stems from not have a phytosanitary certificate from the exporting country. It may be accompanied by a New Zealand phytosanitary certificate from the original export or a re-export certificate. Seed companies report difficulty in getting clearance of this seed at the border. Radish seed is considered of particular concern.

3.2.5. Other Biosecurity

Several other issues were identified as barriers to the importation of new germplasm:

- It was noted that there will be increased demand for new varieties in the coming years because of 'club' varieties. 'Club' varieties are often privately bred and licensed to specific growers and marketers. They change often to keep up with international consumer demand. This creates a need to cycle faster through new varieties to keep up with demand. The germplasm importation system needs to be able to keep up with this demand to enable growers to take advantage of new varieties for export markets.
- Importers and in particular, breeders, noted that obtaining germplasm from China is difficult because they require a germplasm agreement before a phytosanitary certificate can be released. In many cases, the custodians of the material consider such an agreement to be too difficult and therefore the import cannot take place.
- Seed importers noted that some requirements for seed testing are impractical for small seed lot imports. The testing often requires a minimum number of seeds be tested but in some cases, only 150 seeds are imported and testing cannot be carried out as it would require destruction of the whole sample. Importers suggested that an internal containment option was necessary that enabled the seeds to be grown out and observed or leaf tested for diseases.

3.2.6. HSNO Act

- Breeding programmes may want to import species that are not currently present in NZ and this triggers the HSNO Act as they are considered to be new species.
- The status of hybrid species under the HSNO Act is unclear
- The status of endophytes under the HSNO Act is unclear

4. MPI work programme review

4.1. Work programme

MPI was asked to provide a list of requests for Import Health Standard development/review and requests for offshore quarantine facility approval. MPI provided a work programme list based on requests received over the past 3 years. MPI noted in the response that it had provided only external requests, however in assessing the list, it became apparent that a number of the reviews were initiated by MPI in response to import permit requests from industry. In many cases, MPI has advised that the IHS would need to be updated before a permit could be issued.

MPI provided information on requests received for 24 Import Health Standards and 15 offshore facilities associated with plant germplasm imports (nursery stock and seed for sowing) and identified those that were included in the 2013-14 work programme[1]. Table 2 summarises the work schedule as it relates to IHS development and facility approval and notes which of the requests were scheduled for completion in the 2013 -14 MPI work programme and how many were completed.

Table 2 Summary of IHS development and offshore facility approval work programme activities

Activity	**Number of requests**	**No. on work programme for 2013-14**	**No. completed**
Import Health Standard work programme			
New IHS	3	1	0
Add new country to existing IHS	3	0	0
Add new plant part to existing IHS	3	0	0
IHS review	12	6	0
IHS changes (other)	3	0	0
TOTAL	**24**	**7**	**0**
Offshore quarantine facility work programme			
Reaccreditation of currently accredited facility	3	1	1
Accreditation of new facility	6	4	2
Accreditation of existing facility for new crop	0	0	0
Accreditation of GMA testing facilities for seed	5	1	1
Other	1	0	0
TOTAL	**15**	**6**	**4**

Tables 4 and 5 provide the detailed work programme for IHS development and offshore quarantine facility approval associated with imports of plant germplasm (i.e. nursery stock and seed for sowing). The work has been separated into requests that have been prioritised and those that have not. Progress against the 2013-14 work programme has been significantly better in the offshore quarantine area where 4 of the 6 work requests for the 2013-14 year have been completed. In the IHS area, 6 projects were prioritised and none of these has been completed. This work output was reflected in the survey responses with the majority of issues raised being in relation to IHS development rather than onshore or offshore quarantine. Survey responses also showed this situation has been ongoing for some considerable time. In the case of *Pyrus* and *Ribes*, the issues date back to 1998 when an IHS was developed but never published on the website (although Standard 155-02-06 refers to their existence). There have been infrequent imports since 1988 of *Pyrus* and

[1] As of March 2014

Ribes material and the import requirements have been specified on the import permit issued by MPI.

MPI reports that it has a prioritisation policy for Import Health Standard development. The policy requests that requests are prioritised according to their strategic fit, net benefit, barriers and feasibility. The IHS prioritisation policy is available on the MPI website http://www.biosecurity.govt.nz/regs/imports/ihs-funding-mgmt. While this policy is available, it is not detailed and does not provide an explanation of the ranking each of the criteria is given. The outcome of the prioritisation process could be more transparent to those who have requested work and the results could be published on the website. MPI also report that reprioritisation of the work programme is constant and transparent communication of these changes is critical. Improvements in the prioritisation process and the way it is communicated would assist understanding by stakeholders when their project is likely to be considered. This may reduce frustration and provide stakeholders with motivation to consider alternatives such as external funding of work requests.

The process for prioritisation of work requests includes an assessment of value of the product to the New Zealand economy. This is most likely why kiwifruit and grapes are on the current work programme and work is underway. On this basis, the smaller crops such as Ribes are unlikely to be prioritised under current resourcing levels and will continue to be hampered by a lack of new germplasm to address issues of pest resistance and improved productivity.

Table 3 Status of all IHS development and revision requests

Commodity Type	Initiator (Industry/MPI)	IHS status	Country(ies)	Date request received/initiated
Included in 2013/14 work programme				
Actinidia (germplasm - seed, tissue culture, dormant cuttings, pollen for breeding purposes)	MPI	Nursery stock IHS suspended. Seed IHS still 'current' but is being reviewed as part of the RA/IHS review	All	IHS suspended September 2013
Citrus (budwood and TC)	MPI	IHS exists	Australia & All	Out of date testing requirements recognised in 2009 and confirmed with testing manual done in 2010
Citrus (rootstocks/seed for sowing)	MPI/Industry	IHS exists - request to add new countries	Approved countries (may extend to all countries)	2012 - following urgent amendment for Liberibacter
Kiwifruit (pollen for artificial pollination)	Industry	No IHS exists	All	September 2012
Pinus radiata tissue cultures	Industry - now on hold (industry request)	No IHS exists	Australia	2011
Pyrus (dormant cuttings and tissue culture)	MPI/Industry	IHS developed in 1998 but was never added to website. The 1998 IHS only includes dormant budwood (not TC) and was limited to Pyrus communis only - new species requested	All	MPI indicates formal request received for new IHS for Pyrus Species November 2013 (for budwood, pollen and seed). Note this also relates to offshore quarantine approvals for WSU, CTIFL, and CAV. Industry indicates request made 2010.
Vitis (germplasm - seed, tissue culture, dormant cuttings, pollen for breeding purposes)	MPI	IHS exists	All	2011
Ipomoea (Sweet Potato)	MPI	IHS exists but permits not being issued	All	Has been needed since testing manual issued November 2012

Commodity Type	Initiator (Industry/MPI)	IHS status	Country(ies)	Date request received/initiated
Not scheduled on work programme				
Alstromeria	Industry	IHS exists (Basic) - request for new country	South Africa	July 2010
Camelia sinensis	MPI (industry enquiries but never a formal request to import)	IHS exists but permits not being issued (need to develop testing measures)	Current IHS allows from approved countries only	
Capsicum	Industry	IHS for seed exists (but under review) - request for seedless variety, new IHS required	All	Late 2012/early2013
Corylus (Hazelnut)	Industry	IHS exists - request to enhance PEQ requirements	All	About the time the testing manual was issued - October 2008
Geranium	Industry	IHS exists - request for new country	South Africa	October 2013
Humulus (Hops)	MPI / Industry	IHS exists but permits not being issued	All	Three requests recieved from industry: Mid 2013, November 2013, June 2014. We have known it needs to be done since the testing manual was issued in May 2010.
Juglans (Walnut)	MPI	IHS exists but permits not being issued	All	Has been needed since testing manual issued October 2008
Maize (Seed)	Industy	IHS exists - request for new countries	Turkey, Spain, Italy, Romania	Possibly 2011/12
Miscanthus pellets	Industry	IHS exists for TC, pellets requested	Canada & USA	Mid 2013

Commodity Type	Initiator (Industry/MPI)	IHS status	Country(ies)	Date request received/initiated
Oncidium	Taiwan	IHS exists for all countries. Request to add a pre-export system in Taiwan which will allow the import of whole plants in growing media without PEQ on arrival in New Zealand	Taiwan	~2012
Ornithogalum (Arum schedule)	MPI/Industry	IHS exists; requests relate to details of what viruses must be tested for when AD is required that the mother plants/parent stock have been tested and found free from virus diseases		~ 2012
Persea (Avocado); review of pest list and requirements	MPI / Industry	IHS exists	All (in relation to *Phellinus noxious*)	~2011/12
Ribes	MPI/Industry	IHS developed in 1998 but was never added to website. Permits not being issued The 1998 IHS only includes whole plants (not TC) and is limited to Ribes nigrum or Ribes uva-crispum only	All	October 2013 - Formal request just lists Ribes nigrum, for budwood but probably all species would be done.
Ribes - (seed) review the PEQ requirements	Industry	IHS exists - request to review PEQ requirement	All	~2012
Rubus - equivalence request for whole plants	Industry	IHS exists and current	All	Late 2012/early 2013
Solanum tuberosum (Potato) (germplasm - true seed, tissue culture, and pollen for breeding purposes)	MPI/Industry	IHS exists for TC	All	Tissue culture IHS pretty up to date with emerging risks, but true seed needs to be amended, and pollen not currently covered

Table 4 Status of all offshore quarantine facility requests

Commodity	Facility	Country	Why we need to do this
Completed on 2012/13 Work Programme			
Offshore Facility Nursery Stock Audits	Washington State University	USA	Accreditation of offshore facilities for horticultural germplasm for Malus, Prunus and Pyrus
Offshore Facility Nursery Stock Audits	IFV (formerly ENTAV)	France	Accreditation of offshore facilities for horticultural germplasm for Vitis
Currently on 2013/14 Work Programme			
Offshore Facility Nursery Stock Audits	CAV	Italy	Potential accreditation of offshore facilities for horticultural germplasm for Malus, Prunus and Pyrus
Offshore Facility Nursery Stock Audits	CTIFL	France	Potential accreditation of offshore facilities for horticultural germplasm for Malus, Prunus and Pyrus
Offshore Facility Nursery Stock Audits	Dutch bulb Scheme	Netherlands	Development of OAP for Dutch bulb imports
Not on 2013/14 Work Programme			
Offshore Facility Nursery Stock Audits	CFIA Centre for Plant Health	Canada	Accreditation of offshore facilities for horticultural germplasm for Malus, Prunus and Vitis – Completed.
Citrus Nursery Stock	EMAI	Australia	Potential re-accreditation of EMAI offshore facility for Citrus germplasm
Solanum (Potato) Nursery Stock	SASA	Scotland	Potential re-accreditation of offshore facilities for horticultural germplasm for Potato
Ribes & Rubus Nursery Stock	James Hutton Institute	Scotland	Potential accreditation of offshore facilities for horticultural germplasm for Ribes & Rubus
GMO testing for seed for sowing	Eurofins GeneScan US	USA	Review of GMO seed testing facility accreditation
GMO testing for seed for sowing	Max Planck Institute	Germany	New potential GMO seed testing facility accreditation
GMO testing for seed for sowing	ScanBi Diagnostic	Sweden	Review of GMO seed testing facility accreditation
GMO testing for seed for sowing	Eurofins France	France	Review of GMO seed testing facility accreditation

4.2. Work output

In order to assess whether the MPI work programme for IHS review and development is realistic, a high level review of work output has been undertaken (Table 5). Using the consultation archive and the amendment record of the IHS, the following is a summary of work output in relation to the nursery stock IHS (155-02-06) and the seed for sowing IHS (155-02-05). Only work that has resulted in issuance of documents for consultation has been considered – urgent or minor amendments are excluded.

Table 5: Summary of plant germplasm IHS work output 2010 - June 2014

Commodity	Consultation date	IHS update date
Vitis nursery stock	2013	2014
Malus seed	2013	2013

Commodity	Consultation date	IHS update date
Tomato seed	2012	2012
Reformat of seed for sowing IHS, including revision of Pinus and Psuedotsuga schedules	2012	2012
Artocarpus nursery stock	2012	2012
Malus nursery stock	2011	2012
Rubus seed	2011	2012
Eucalyptus, Engenia, Metrosideros nursery stock	2011	2013
Phalaenopsis nursery stock	2011	2011
Castanea, Quercus, Acer and other Cryphonectria seed hosts	2011	2011
Maize seed	2010	2010

In addition, a policy on the bulking of samples for nursery stock was consulted on in 2013 and released in 2014.

The work output analysis indicates that since 2010, six seed and five nursery stock schedules have been developed or substantially revised. Based on this, at best, the feasible output of IHS schedule revisions is up to 3 per year.

The current IHS work programme lists seven projects and there is work on an additional project (sweet potato) that was not on the work programme. In addition, a major review of the Post-Entry Quarantine standard is being undertaken. The seven scheduled projects are:

- Actinida – all germplasm types. Full review.
- Citrus – tissue culture/seed/roostocks. Update following urgent amendment and need to update testing requirements after testing manual update in 2010
- Actinida pollen – new IHS
- Pyrus – dormant cuttings and tissue culture. Full review including addition of new species
- Vitis – all germplasm types. Scope of work unknown
- Rosa – all germplasm types; IHS review
- Capsicum seed for sowing; IHS review

All of the scheduled projects on the work programme appear to be supported by industry.

The analysis of work output indicates that 2 IHSs are made available for consultation each year. It is extremely unlikely that the 7 projects that are scheduled on the work programme, and the additional unscheduled work on sweet potato could be completed within a year with existing resources and processes. It seems more likely that it will take at least three years to complete this work. If that is the case, then no additional projects will be commenced until 2017. There are a further 19 projects listed on the work programme. If work does not begin on these projects until after the current projects are completed in 2017, it is likely to take at least another 10 years to undertake the work on the work programme, not accounting for any additional requests. When additional requests are received, these may be prioritised

higher than those existing projects on the work programme and the timeframe for completion will extend even further. Concerns around the current levels of resourcing to complete IHS development and review are discussed further in Section 8.1.

5. Key Barriers to Importation of Germplasm

Using the feedback from the survey, the key barriers to importation of germplasm are described in the following sections.

5.1. Import Health Standards

5.1.1. IHS development / review

The lack of an Import Health Standard is the most obvious barrier to the importation of plant germplasm – without an IHS, there are no opportunities for import. There are 24 projects relating to IHS development or review on the current MPI work programme. Of these, three projects relate to industry requests for a new IHS to be developed (kiwifruit pollen, capsicum plant material, *Pinus radiata* tissue culture). The ornamental industry noted that there were a number of other IHSs they would like to have in place but they have not submitted a formal request for IHS development because they have been advised it will take too long. It was noted that even if industry agreed to pay for the development of the IHS, MPI have indicated that it would be too expensive and take too long. It is noted that MPI do not appear to have a set policy for cost recovered IHS development. MPI consider that this is an option, but there is no formal policy available currently to indicate possible costs and timeframes and it is difficult to see how such a request would be progressed.

The same is true where industry have requested the addition of a new country or new plant part to an existing IHS. An importer from the ornamental industry enquired about importing tissue culture from a new country not currently included in the IHS. The importer reports he was told it would take between 10-15 years for the work to begin on the IHS change. Given this timeframe, the importer did not proceed with a formal request. The importer questions why it is so difficult to add new countries to an existing IHS for tissue culture.

The current IHS request list for plant germplasm lists 24 projects where requests have been made but industry would like to include additional requests. MPI is currently working on seven projects but has an average completion rate of 2 IHS projects per year. At the current work output rate, the barrier of import health standard development/review will continue to be the biggest barrier faced by importers.

5.1.2. IHS exists but permits not being issued

A number of responders were under the impression that the IHS for their crop had been suspended awaiting update, however upon review it appears that the IHSs have not been officially suspended. Rather, MPI has stopped issuing import permits until the IHS is updated. MPI is currently considering the possible suspensions of IHSs. However, as this has yet to be completed there is confusion over the status of the IHS as identified by the following industries:

- Blackcurrant
- Hops
- Pears

In addition, the work programme analysis identifies a further four IHSs where import permits are not being issued:

- Sweet potato
- *Camelia sinensis*
- Walnut
- *Malus* (pollen)

In some cases, respondents noted that it was only when they applied for an import permit that importers were advised that the IHS was out of date. For example, an importer applied for a permit to import blackcurrants and was advised that no permit would be issued as the IHS and testing manual were out of date. The importer was initially advised that the timeframe for the review would be 12 months but the work is not even scheduled on MPIs work programme and there is no review timeframe. In the meantime, no imports can take place. On the same crop, an importer imported blackcurrant seeds in accordance with the IHS. The seed was held by MPI on arrival and the import conditions changed to require testing of each individual plant derived from each planted seed. The cost of this testing is prohibitive to the importer who is now waiting for the budwood IHS to be updated – but this is not scheduled on the MPI work programme.

A similar situation exists with hops whereby the IHS lists requirements for hops but MPI will not issue an import permit. One industry source indicated that they have been waiting since 2002 for a risk assessment to be issued. Another industry source indicated that the need to update the IHS was signalled at least 3 years ago but no progress has been made and the Hops IHS is not included in the current MPI work programme.

It is important to note that in these instances, the IHS has not been officially suspended but imports are not able to take place as an import permit cannot be obtained. This lack of clarity over the status of the IHS enhances confusion and frustration. There is a considerable amount of work that takes place before an importer applies for an import permit including identifying the material they wish to import, the exporter and potentially a license agreement. This work takes place before an import permit application is made and is a wasted investment if MPI then decide not to issue a permit in accordance with the IHS.

The practice of preventing imports taking place by not issuing import permits is questionable. ISPM 20 considers an import permit to be a phytosanitary measure and it is acceptable to use an import permit to track material after entry. However, since the Biosecurity Act was amended in 2012, an import permit cannot be used to alter the requirements of the Import Health Standard. Under Section 24, an import permit must only be issued where there is a valid IHS. Therefore, if MPI considers the requirements of the IHS are not sufficient to manage the risk of importing the product, it should either suspend or update the IHS. If MPI suspends the IHS, it is presumably doing so under emergency provisions. ISPM 13 indicates that any such emergency action should be evaluated as soon as possible to ensure that its continuance is technically justified. If continuance of actions is justified, phytosanitary measures of the importing country should be adjusted, published and transmitted to the exporting country. It is not acceptable to maintain emergency action (i.e. suspension) for the medium or long term. In the case of *Pyrus* and *Ribes*, while not officially doing so, MPI has effectively suspended the IHSs since 1998 by not allowing imports. A delay of 16 years in revising the IHS is not acceptable.

Industry groups experiencing this situation should consider asking the NPPO of the country they wish to import from to contact MPI and formally ask for the IHS to be reinstated. A country to country request may attract more urgency than an internal industry request to MPI.

5.1.3. Testing manual

In some cases, the reason given for not issuing an import permit is that a testing manual is out of date. During this project, a work programme for testing manual development has not been seen. If testing manual work is holding up the issuance of import permits or the updating of an IHS, then a work programme should be developed and made available for consultation.

The legal status of the testing manual is unclear. The MPI website provides the following explanation "*MPI's Plant Health and Environment Laboratory (PHEL) develops PEQ testing manuals, describing the materials and methods used to test for pests and diseases in quarantine, based on the requirements described in the import health standard*". MPI advises that recent versions of the testing manuals include the following disclaimer "*The information in this document is intended by way of general guidance only. It is not intended to take the place of, or represent the law of New Zealand. It is not intended as legal advice and should not be relied upon as such*". While the testing manual is referred to in the Import Health Standard the explanation above explains that it does not form part of the IHS. MPI needs to ensure that the linkage between the IHS, the import permit and the testing manual are clear.

5.1.4. IHSs out of date

There are cases, particularly in the seed and ornamental industries where IHSs specify treatments that are no longer available or not considered best practice. The best example of this is in the seed industry where seed treatments are often required by IHSs to address fungal contamination risks. IHSs specify the type of treatment that must be applied before a phytosanitary certificate can be issued by the exporting country. Because the treatments are not available in the exporting country, exporters either cannot get a phytosanitary certificate or must have the treatment applied on arrival in NZ (if the treatment is available).

In recent years, this problem appears to have been addressed by the issuance of letters from MPI allowing alternative treatments to those specified by the IHS. Exporting country authorities took these letters on MPI letterhead as authorisation to work outside of the specified treatments in the IHS. More recently, MPI have stopped issuing these letters as it was considered by MPI that the only legal option for import was where the requirements of the Biosecurity Act and the IHS were met. There is no legal provision in the Biosecurity Act for letters issued by MPI to be considered as establishing import requirements different to those specified in the Biosecurity Act and relevant IHS. The change in policy which no longer allowed the issuance of letters allowing alternative treatments was not discussed with industry to enable a pro-active solution to be implemented by MPI in a timely fashion. Industries called a crisis meeting with MPI in June 2014 and are now in discussions with MPI to resolve the situation on certain species of seed.

The ornamental industry noted similar concerns with treatment schedules that are out of date. Both industry groups indicated they were unsure how to achieve a resolution and initial discussions with MPI staff had not provided them with a plan for

resolution. Where treatments are specific in an IHS, this will continue to be an issue that needs a proactive and long term resolution.

Some industries noted concerns that while they have a current IHS at present and can import, the next time they apply for a permit, MPI might not issue one citing new pest risks. This lack of certainty is of serious concern. Industry feels that MPI should have in place a proactive review schedule that identifies new pest risks and resolves these before a request to import is received. A regular review system would also allow MPI to notify industry of new risk concerns earlier so that issues with gaining an import permit do not come as a surprise.

5.2. Offshore quarantine

The offshore quarantine system is designed to allow testing and quarantine to happen offshore to reduce the time and activities required in onshore quarantine in NZ. Once the offshore quarantine facility and testing regime is approved by MPI, material can enter NZ quarantine for a reduced quarantine period to undertake observation and any testing that the offshore facility was unable to perform. The system has two advantages:

- Reducing the level of quarantine required in NZ (i.e. can enter Level 2 PEQ when sourced from an offshore facility)
- Reducing the time and cost of quarantine in NZ

For the offshore quarantine system to have advantages to NZ importers, both of these benefits need to occur. Importers noted that where testing was required in New Zealand because it could not be undertaken at the offshore facility, this can lead to significantly increased costs and time in quarantine. This may occur because an offshore facility does not feel the testing is required, they don't have access to the techniques or for some other reason. New Zealand is a small throughput importer and facilities are unlikely to introduce testing or treatment just to satisfy NZ import requirements. There were also some reports that tests which had been undertaken in the offshore facility were repeated in quarantine in NZ. If a facility is accredited by MPI to undertake a specific test that is required, and it has been done, then there is no reason why material should be held in quarantine while that test is repeated in NZ. If MPI requires this to enable auditing of the offshore testing system, then consideration should be given to whether it is necessary to hold the material in quarantine while this takes place.

There are currently five offshore facilities on the work programme for accreditation and three for reaccreditation. Some of the facilities on the programme for accreditation had previously been approved but the approval had lapsed. The cost of reaccrediting the facilities was identified as a barrier. Industry groups or importers are required to fund the accreditation process. Importers see this as unfair as anyone can use the facility once it is accredited. Some industry groups cover the cost of accreditation as a public good, but then are unable to find out who is using the facility and how often as this is considered commercially sensitive.

The reaccreditation process is also viewed as costly and time consuming by the facilities themselves. These facilities are often doing NZ importers a favour by allowing the process to occur. They make no money from it and it adds to their workload. The process of accreditation needs to be as efficient as possible to ensure that they continue to provide the service. If NZ importers were required to

cover all the costs of accrediting and operating the facility and the testing required, it is unlikely that it would be affordable. Facility operators have commented to NZ importers that MPI asks the same questions a number of different times and do not appear to trust the facility operators at face value. These facilities are often operated by government agencies or universities that are world leaders in their field and the MPI system needs to find a way to recognise that.

5.3. Post entry quarantine

In general, respondents were positive about the post entry quarantine systems in New Zealand. Those industries that use the MPI facility were supportive of this facility and felt that it provided a good service. Responses from those groups that operate post entry quarantine facilities were generally happy but had some comments where the service could be improved. These comments generally related to availability and experience of inspectors. It was felt that better use should be made of local experts/inspectors to reduce the cost of inspections and reduce the overall cost of undertaking post entry quarantine. Feedback on tests required in quarantine is covered in the next section.

In 2012, GERMAC has commissioned a report on the cost of post-entry quarantine in New Zealand[2]. This report reviewed costs incurred by eight PEQ facilities in New Zealand. The report found that the total costs of plant germplasm imports remained relatively consistent across the five year period analysed (2005-2010). Time in post-entry quarantine is a significant factor in the cost of imports with the high value crops reviewed spending on average more than 15 months in quarantine. In reviewing MPI costs, the report found that inspection of plant material by MP inspectors is the most significant cost incurred in PEQ at over 50%. Testing costs are responsible for between 12-40% of costs and administration costs (including permit and on arrival inspections) the reminder. Inconsistency in testing and inspection costs between facilities was also noted.

The 2014 survey results support the results from the 2012 report with feedback centred on the need to reduce time in PEQ and therefore the cost of inspections to reduce the overall cost of PEQ. Recommendations from the 2012 report still appear to be valid:

- Collaboration between MPI and industry on improvements in testing methods.
- Consideration of reduced audit and inspection regimes where there is sufficient confidence in procedures and staff.
- Consideration of establishing procedures to ensure consistent charging of importers and PEQ facilities.

5.4. Testing

Testing requirements were an area identified as causing barriers for both offshore and onshore quarantine. Comments related to the level of testing required, acceptance of testing undertaken offshore and incorporation of new testing technologies.

For some high value crops, importers are required to germinate each seed and test the resulting plant for quarantine pests. Where evidence can be supplied that the

[2] Post-Entry Quarantine (PEQ) Cost Review Report. GERMAC. June 2012.

seeds are from the same mother plant, some bulking (up to 5) is allowed. The requirement to germinate each seed is considered cost prohibitive and as a result some imports of seed are not taking place. Importers find this frustrating and the focus has shifted to other propagative material such as cuttings. Seed is generally considered to be less risky than cuttings because a number of organisms are not seed transmitted. However, the requirement to germinate and test each seed makes the seed testing requirements perhaps more intense than budwood.

Other participants noted that some pathways (such as sterile tissue culture) are significantly lower risk than importation of plant material and should be given higher priority for IHS development. Tissue culture is considered to be a lower risk pathway for quarantine pests than budwood or other plant types but importers felt that the conditions were unnecessarily strict. It was suggested that a more generic IHS could be developed for sterile tissue culture to cover a range of species based on the pathway risk. It was noted that in some cases, the requirements to import seed are less restrictive than the requirements for tissue culture even though tissue culture could be considered a lower risk pathway. Tissue culture could be a very efficient pathway for the importation of germplasm and it is important to ensure measures are commensurate with actual risk.

It was suggested that where molecular testing was available, woody indexing should not be required and the material be released to a lower level of quarantine for a period of observation – during which time bulking and observation for commercial application could be taking place. This would speed up the development time and reduce quarantine costs as woody indexing is expensive. However, other industries noted that it was necessary to have testing that would identify unknown pathogens and at present woody indexing was the best option for this. Next Generation Sequencing was identified as a possible option to replace woody indexing. More work is required on this technology to determine its suitability to replace woody indexing and speed up quarantine time.

In 2011, a proposal was submitted to GERMAC to review current and new testing technologies relating to costs in PEQ (Appendix 2). This proposal suggested the development of a working group that would provide support to MPI in identifying and investigating areas of review and provided examples of some initial work. One of the projects suggested in this proposal was to consider the bulking of leaf material samples and this work has now been completed. However, there were other projects suggested in the proposal that may still be relevant and consideration should be given to including suggestions from this proposal into an ongoing workplan for GERMAC.

5.5. HSNO Act

Different industries noted that the status of hybrid species under the HSNO Act is an emerging issue. This is a particular issue when conventional breeding techniques are used to incorporate certain characteristics from one species into another. This may happen with two closely related species where the main species is recognised as present in NZ and 'not new' but the characteristics are taken from a species which is not present in NZ. Clarification on this issue is required from EPA.

The seed industry raised issues with understanding the status of endophytes under the HSNO Act. Endophytes are symbiotic organisms (fungi or bacteria) which are attached to many economically important grass species. They occur naturally and

are considered beneficial to many commercially traded grass species. Importers noted that the legal status of imported seed with endophytes is unclear. It is unclear whether it is necessary for each endophyte to be approved under the HSNO Act as 'not new'. Importers may not be aware that an endophyte is present on seed when importing, they questioned whether they are required to determine if an endophyte is present before importing. They also questioned the list of endophytes that are allowed as it is not exhaustive and does not include all native endophytes. Clarification of the status of inseparable organisms such as endophytes under the HSNO Act is required.

In both cases, it is possible that legislative change may be required to obtain the clarification needed. If this is the case, industry will need to request and strongly support such a change.

6. Impact assessment

Quantifying the impact of problems with importing germplasm into New Zealand is very difficult. In most cases, survey respondents were unable to estimate the economic impact of not having access to new germplasm. Table 6 below provides a summary of the economic impacts that were described by survey respondents.

Table 6: Specific impact assessment comments received from industry[3]

Industry	Issue	Impact	Cost
Grapes	Seed requirements changed to require 2 years in quarantine	Increased testing cost makes breeding programme unviable – no improved varieties	$300,000 testing cost per batch of seed which is unfeasible. Will result in increased cost of pest control. Impacts on ability to market pesticide free wine.
Prunus/Malus	Cost and time delay in release from quarantine	Delays in variety improvement	Cost of quarantine = $10,000 per variety, takes 3 years. Lost export market opportunities - $100m / year over the last 20 years.
Blackcurrant	Changed seed requirements / no valid nursery stock IHS	Delays in variety improvement - cannot import material resistant to Currant Clearwater Aphid	$4m p.a. loss production or increased cost of production from having to control aphid.
Ornamental	No IHS to allow tissue culture imports for 3 species	Associated export market opportunity not fulfilled	Estimated lost export opportunity of $500,000 p.a.

[3] Note that these responses are from survey respondents and have not been validated

Industry	Issue	Impact	Cost
Hops	No IHS to allow breeding material imports	No improved varieties	Industry has potential $100m export value – needs new germplasm to achieve this.

In 2012 a report to GERMAC[4] quantified the cost of undertaking Post Entry Quarantine and noted that half of the cost was related to inspection costs with 12-40% of the cost associated with testing. A better model for assessing economic impact is needed to quantify this area accurately.

6.1. Inability to import

The greatest impact results when the lack of a valid IHS prevents imports taking place resulting in long term impacts. The process of importing new germplasm and commercialising is likely to take a minimum of 15 years. Impacts from delays in importing material most likely not be felt until those varieties would have entered the commercial market in 15-20 years time. The process to rectify the situation would then take another 15-20 years once imports recommence. Given the difficulties of estimating these costs a very rough assessment of potential lost improvement value across the groups waiting for IHS development has been undertaken. There are seven industry groups on the IHS work programme that cannot currently import germplasm (kiwifruit, kiwiberry, pyrus, hops, walnut, blackcurrant, camelia). The combined value of these industries is close to $1b (kiwifruit is valued at $934m). If you assume a 10% lost industry value improvement from not having access to new germplasm, the impact per annum is likely to be in the region of $100m. The kiwifruit and pyrus IHSs are on the current work programme and are likely to be resolved within 1-2 years so that leaves industries worth $25m waiting for IHS development. These industry groups have been waiting for some time already so it is not unreasonable to suggest that under current management of resourcing, they may wait at least a further 10 years for IHS development (see Section 5.1). Using the figure of 10% loss of industry improvement value, over 10 years while waiting for an IHS, these industries will have lost a further $25m in possible value.

The hop industry is a specific case where they cannot current import germplasm. They describe the impact as follows:
"NZ does not have any of the major pests & diseases that affect hop growing in most other countries. Importation of germplasm is part of our key breeding strategies to "future proof" the NZ hop industry. Currently the farm gate value of NZ hops is in the order of $15M, 85% of which is destined for export. Coupled with that, exports of beer derived from NZ grown (& bred) hops is growing rapidly, with a current estimated value of $40-50M. This is projected to grow with a potential to reach > $100M by 2030 (Coriolis Report, 2012). NZ's good international position in hop production is due to its novel hop cultivars, which coupled with the fact that no pesticides are used on the commercial crop, is leading to our country being viewed internationally as a producer of unique hops suitable for the premium end of the market space. Thus any pest or disease incursion will severely affect our ability to meet and compete in this international market space. In summary, importation of

[4] Post-Entry Quarantine (PEQ) Cost Review Report. GERMAC. June 2012.

Humulus germplasm as a source of resistance is essential for the future proofing of the hop industry".

The hop industry also notes that without a valid IHS it is unable to progress an offshore quarantine facility approval. It has identified a facility that could be used but industry believes they cannot progress the approval of this facility until the IHS is updated. This could potentially see a substantial further delay while the approval of the new facility is prioritised. MPI have indicated in response to this that the two processes could potentially be run in parallel – yet this still requires work on the IHS to be initiated and as yet it is not even prioritised on the current work programme.

In the ornamental industry, the impact is extended to a direct impact on export value. There is an export business opportunity that involves importing tissue culture germplasm and exporting plants as the end product. It was noted by several responders that the cost of not being able to import is estimated to be $500,000 p.a. as the inability to import tissue culture germplasm affects the ability to export the end product.

In some cases, there is a valid IHS in place but the testing requirements are cost prohibitive and imports do not take place. Two specific cases where identified:

- The blackcurrant industry wants to import new material to address resistance for currant clearwing aphid which is costing an average of $4m per year in lost production and increased control costs. However, the seed IHS requirements are cost prohibitive and no IHS exists for nursery material.
- The grape industry notes that new testing requirements for grape seed have increased costs to $300,000 per batch and that has effectively made enhancements in germplasm via seed an unviable option. Such an expensive testing regime makes importing for screening unfeasible. The impact of not being able to import seed in this case is that the breeding programme to screen for pest/disease resistance has been shut down. The long term implications of this are that the industry continues to be reliant on agrichemical sprays for pest/disease control. In addition to increasing production costs, it also impacts on New Zealand's ability to market higher value wine produced from spray free grapes.

6.2. Restricted import programmes

Even when an IHS is available to allow imports to take place, the cost of accrediting an offshore facility or operating an onshore facility along with all the testing can still have impacts. PEQ has long been recognised as an expensive process which is difficult to undertake with the limited and diverse throughput needed in NZ. However, it was felt that the process has become significantly more expensive and the offshore quarantine system may not be reducing either the time or cost of PEQ. One respondent noted that Level 2 PEQ for *Pyrus* and *Prunus* used to be a 6 month process and cost $500 per variety. Now it costs $10,000 and takes 3 years.

Exporters noted that due to quarantine costs, they cannot financially justify importing as many varieties to test in NZ conditions as they would like. They are restricted to those which they are confident will provide a return on investment and this is stifling innovation. The speed at which they can identify desirable traits in imported germplasm and incorporate these into a commercial variety is limited by

their ability to fund the quarantine process. This means the availability of innovative new varieties is impacted.

Survey respondents noted that their international competitors have better, faster, and cheaper systems for importing germplasm that is often paid for by governments. Their access to these systems leaves NZ at a disadvantage internationally. While it is difficult to quantify, it seems clear that the growth of the export industries in New Zealand is being hampered by barriers to the importation of plant germplasm.

6.3. Unintended consequences

Survey respondents noted that in other countries, complex and inefficient import systems for germplasm imports have led to incidents of smuggling and new pest outbreaks. In particular, the detection of plum pox virus in USA was referenced as an example of what can occur if importers find the process of legally importing too difficult to comply with. Similarly, the outbreak of citrus greening in both Florida and California can be directly linked to home garden imports. Other countries, such as the USA, have recognised the risk of this and have invested in publically funded effective, rapid import systems for plant germplasm. The Australian government monitors requests from home gardeners for unusual types plant germplasm not currently available in Australia. It then imports the germplasm and makes it available to the public at no cost to prevent disgruntled gardeners from smuggling plant material.

The risk of new pest and disease outbreaks from illegally imported plant material must be distinctly acknowledged as a risk by MPI and by industries. This pathway probably poses the greatest risk of importing pests and diseases that could have devastating impacts on the industries. These industries and MPI work hard to ensure that risks from legitimate imports are managed – but this will be in vain if smuggled material introduces the same risks. New Zealand needs to ensure that where possible, risks from smuggling are identified, and addressed.

7. Key impacts

Three key impacts have been identified as arising from barriers to importing plant germplasm

- Inability to import
- Restricted import programmes
- Biosecurity risks from smuggled plant material

It is important to identify the reasons for these barriers in order to lessen the impact.

7.1. Resourcing

The current IHS development work programme includes work on 25 Import Health Standards and of these no projects were completed in the 2013-14 financial year, although some work has been initiated. The historical review of work output in Section 4.1 identifies that on average 1-2 IHSs would be issued each year. There are 25 IHSs on the work programme and industry groups noted that there is a need for further IHS development which are not currently on the work programme.

There are a number of reasons why work on the IHSs has not progressed:

- Staff working in this area are also required to work on other issues whose urgency often supersedes IHS development. These include:
    - Emerging issues

    - Border clearance issues
    - Import permit issuance
    - Post-border and trade responses

  Without a robust and consistency applied prioritisation process, work will inevitably take place on the urgent issues management to the detriment of IHS development and maintenance work.
- The development of an IHS requires the completion of a risk assessment. The risk assessment process is handled by a different team that also handles risk assessment requests from other teams such as fresh produce. The prioritisation process for risk assessment development is unclear.
- Lack of dedicated IHS development staff.
- Lack of process for externally funding and developing risk assessments and IHSs.

There are currently 3.5 FTEs focussed on plant germplasm imports, including PEQ within the Plant & Forestry team. Other import advisers within the Plant & Forestry team cover imports of forestry products, plant product and laboratory and biological specimens. MPI reports that the Plant & Forestry Team spend approximately 2-25% of their time on IHS development and reviews, with the remainder of their time spent on ongoing management of the IHSs, including assessing emerging risks, border non-compliances, issuing import permits as well as Ministerial and Department servicing and managing public and stakeholder relationships and enquires. Resourcing of the Plant & Forestry team is unlikely to attract attention from exporting countries that will remind MPI of their obligations to ensure least trade restrictive measures are in place. In other areas, exporting countries which consider the trade important would place pressure on MPI for a timeframe for review of the suspension to allow trade to resume. This would also ensure that risk analyses be conducted within a responsible period of time. Because germplasm imports are driven by NZ industries rather than by exporting countries, the same pressure does not appear to be in place.

When considered in terms of value to NZ as a whole, one could argue that there is significant value to the country from facilitating germplasm imports that will result in enhanced productivity and increased export value of resulting crops. The value of the germplasm industry to NZ does not appear to have sufficient recognition by MPI management and as a result, resourcing within MPI is not sufficient.

7.2. Technology

New testing technologies could play an important role in improving access to germplasm. New testing technologies are constantly being developed to speed up the process of releasing plant material. Other countries face the same issues as New Zealand in wanting to release material as quickly as possible but without compromising biosecurity. It is acknowledged that these new technologies need to provide NZ with the same or better level of protection than is currently available. New Zealand needs to ensure it is at the forefront of discussion and testing of these technologies to ensure that New Zealand industries can benefit from them at the earliest opportunity.

8. Recommendations for implementing change

From Section 5 where the barriers to importation are outlined and Section 6 where the impact of these barriers is discussed, some key issues can be identified as the main areas of concern. Table 7 outlines these main areas, summarises the impacts and provides initial commentary on a possible solution.

Table 7: Identification of the barriers to importing germplasm that have the greatest impact

Barrier	Impact	Reason	Solution
No IHS exists	No import of germplasm	Resourcing	Enable external development, additional resourcing, improve prioritisation systems, improve efficiency of processes
IHS suspended	No import of germplasm	Resourcing / Inefficient processes	Enable external development, additional resourcing, better prioristaion. Remove distraction from other issues. Improve efficiency of processes
IHS exists but out of date and permits not being issued	No import of germplasm	Resourcing /Policy improvement/ Inefficient processes	Suspend IHS, initiate resolution timeframe. Proactively review IHSs to identify and fix issues. Simplify systems for adding new/additional treatments.
Lack of review schedule for IHS	Uncertainty around status of IHS	Policy improvement	Implement a regular review schedule for IHSs.
PEQ cost prohibitive	Reduced germplasm imported	Technology, policy improvement	Continue to proactively review new testing technologies. Lead international debate. Review and implement outcomes from PEQ review.
Facility approval process is time consuming and costly	Reduced germplasm imported	Resourcing/ policy improvement/ Inefficient processes	Review approval system and consider options for improvement, improve efficiency of processes
Border clearance	Germplasm material damaged	Policy improvement	Ensure border staff understand sensitivity of nursery stock material and handle it correctly

There are four key areas where recommendations on improving access to germplasm are made. These are resourcing/efficiency improvements, regulatory/policy improvement, management systems and technology.

8.1. Resourcing/efficiency improvements

- Raise the profile within MPI and the wider political environment of the importance of access to new germplasm to growing New Zealand's economy
- Prioritise the development and implementation of faster, more efficient systems and processes for IHS development and amendments.
- Review the resourcing and resource management in the Plant & Forestry team to ensure it is adequate to remove barriers to importation of plant material over a reasonable timeframe.
- Ensure that risk assessments for germplasm are prioritised as a matter of urgency.
- Review the work allocation within the Plant & Forestry team and ensure some staff have primary responsibility for updating IHSs and are not distracted by other issues.
- Incorporate the outcomes of the 2012 PEQ cost review into the outcomes from this report focussing on reducing time in PEQ and considering options for reducing audit/inspection regimes for proven facilities.

8.2. Regulatory/Policy Improvement

- Clarify the legal position of IHSs, import permits and the testing manual.
- Where an IHS is out of date, suspend or revoke it – do not leave it as current in the IHS and just not issue permits.
- Develop an anti-smuggling policy that specifically recognises the risks from having a germplasm importation system that is expensive and time consuming.
- Improve communication around the IHS development prioritisation system
- Develop and implement a policy for externally developed IHSs
- Consider whether lower risk pathways such as tissue culture imports could be prioritised and streamlined.
- Review the GERMAC Testing Technologies Proposal (2011) and incorporate proposed outcomes from this work into the GERAMC workplan.
- Consider suggestions on options for reducing the period plants must be in high level quarantine – these may include whether molecular testing could replace woody indexing in some cases, with the addition of a lower level quarantine observation period.
- Undertake a review of the systems for offshore facility approval and identify areas where the process can be streamlined. Consider having staff dedicated to this work area.
- Obtain clarification from EPA on the application of the HSNO Act to endophytes and hybrids. Consider whether this advice will enhance barriers to importation of germplasm.

8.3. Management Systems

- Develop a more defined process of prioritising work programmes for IHS work and offshore quarantine facility accreditation and extend it as far as necessary to provide a date for every project – 12 months is not sufficient. Ensure the workplan for the year is achievable and structure resourcing to

ensure outcomes are achieved. Clearly communicate the prioritisation workplan to those who have requested work be undertaken. Ensure that any changes in the workplan use the same prioritisation process and are clearly communicated.

- Implement a procedure for reviewing high value IHSs on a regular basis to identify issues before they require the suspension of the IHS.
- Review efficiency of work allocation systems in use to ensure that limited resources are being used to achieve greatest impact.

8.4. Technology

- Ensure that MPI is contributing to international discussions on potential new testing technologies.
- Industry and MPI should continue to review and invest in research of to support new testing systems and technologies including initiatives to ensure pest free status of imported material.
- Assess the tissue culture pathway to determine how this technique inherently manages some pest risks. Consider assessing tissue culture imports as a separate pathway if this will allow fast development of IHSs.

9. Action plan for GERMAC

1. Work to better quantify the benefit to NZ Inc from the importation of improved germplasm – consider updating the report with this information
2. Develop a communication plan for the report to both industry and government (including MPI).
3. Present to MPI Senior Management the value to NZ of germplasm imports with a view to raising the profile of this area and thereby increasing resourcing, particularly in import health standard development.
4. Incorporate recommendations from this report into the MPI workplan.
5. Develop an ongoing workplan for GERMAC.

Appendix 1: Barriers to importation of germplasm - Survey

Background

GERMAC is the consultative group between MPI[5], EPA[6] and industry on regulatory issues relating to the importation of plant germplasm (including seed). GERMAC has facilitated the initiation of a report reviewing the barriers to importing plant germplasm into NZ. As part of this, GERMAC is seeking your views on the impact of regulatory barriers on the importation of germplasm into New Zealand.

Market Access Solutionz has been asked to research and compile the report. The report will identify what barriers are faced by importers of germplasm and will quantify the economic impact these barriers have (at a high level). The resulting report will be used to communicate the importance of resourcing this work area within MPI and with Ministers.

We are requesting input from a wide range of people including industry organisations, importers, nursery stock providers and seed companies on their experiences with importing plant germplasm. The review is limited to importing species which are already present in New Zealand – they are not New Organisms under the HSNO[7] Act.

In order to ensure a wide coverage of your industry's concerns and experiences, please send this survey to any contacts that you think might be able to provide input including any organisations that import germplasm to service your industry.

Survey

Please complete this survey form if you have experiences with importing plant germplasm which may inform the report. Individual survey responses will not be disclosed, the information will be collated and used to communicate with MPI about the effectiveness of the Import Health Standard (IHS) development process. Your contact details are requested so that we can contact you if there are areas of clarification from your survey response but will not be provided to GERMAC or MPI.

The survey is in 3 sections:

1. Import Health Standards (New and Existing)
2. Post entry quarantine
3. Offshore quarantine

Please send your response to the survey by email to:
nikki@solutionz.co.nz
by **Friday 6 June 2014**

Alternatively, you can respond to the survey via phone by calling:
Nikki Johnson
04 4736040

[5] Ministry for Primary Industries
[6] Environmental Protection Authority
[7] Hazardous Substances and New Organisms Act

Your Contact Details:

Name	
Company	
Contact Phone	
Email	

Section 1: Import Health Standards

1	**NEW IMPORT HEALTH STANDARD**		
1.1	Do you want to import plants which **do not** currently have an IHS?	Yes	*[Please List by Species name]*
		No	*[Please skip to Section 1.5]*
1.2	Have you requested MPI to develop an IHS at any time in the past 5 years?	Yes	*[Please state which year the request was made for each species]*
		No	*[Please comment on why you have not requested an IHS to be developed]*
1.3	Was the request to develop an IHS successful?	Yes	*[Please state how long this process took and whether you were satisfied with the timeframe and the outcome. If possible, please indicate the annual economic benefits likely from having the IHS available].*
		No	*[Assuming the request is still valid, please estimate the annual lost opportunity cost from not being able to import new material – you could consider this in relation to your business or estimate the cost to the industry as a whole e.g. 5% lost productivity per year]*

1.4	Is the development of your IHS waiting on the development of a risk assessment?	Yes	*[Please advise how long you have been waiting for a Risk Assessment and its current status]*
		No	*[Please move to Section 1.5]*
	EXISTING IMPORT HEALTH STANDARDS		
1.5	Is there a current IHS for your plant species?	Yes	*[Please state the species]*
		No	*[Please complete the section on new IHSs above and move to Section 2]*
1.6	Are you satisfied with the conditions of the existing IHS?	Yes	*[Please move to Section 1.7]*
		No	*[Please supply detail on the conditions causing problems including estimated economic impact of the issues experienced]*
1.7	Are you experiencing any difficulties with clearing shipments at the border?	Yes	*[Please supply detail including estimated economic impact of the issues experienced]*
		No	*[Please move to Section 2]*
1.8	Have you requested a change to the existing IHS?	Yes	*[Please supply detail on the request and the outcome]*

		No	*[Please provide comment on why an IHS amendment has not been requested to address issues identified in Section 1.6 or 1.7]*
1.9	Are you waiting for an IHS amendment to be published?	Yes	*[Assuming the request is still valid, please estimate the annual lost opportunity cost from the changes not being made – you could consider this in relation to your business or estimate the cost to the industry as a whole e.g. 5% lost productivity per year]*
		No	*[Please move to Section 2]*

Section 2: Post Entry Quarantine Facilities

2.1	Do you use or operate post entry quarantine facilities for material on-arrival in NZ?	Yes	*[Please list species and quarantine level].*
		No	*[Please move to Section 3]*
2.2	Are you satisfied with the regulatory processes associated with this facility e.g. facility approval process, time for release of material, acceptance of new testing technologies, cost of approval.	Yes	*[Please move to Section 2.3]*
		No	*[Please supply detail, including estimated economic impact of the issues experienced]*
2.3	Please provide any comments on post entry quarantine facilities that you feel		

	may be relevant to this study.

Section 3: Off-shore Quarantine Facilities

3.1	Does any material that you import into New Zealand go through an approved off-shore quarantine facility before entry into New Zealand?	Yes	*[Please list species and facility name]*
		No	*[Please move to Section 3.4]*
3.2	Are you satisfied with the regulatory processes associated with this facility e.g. facility approval process, time for release of material, retesting requirements in NZ, acceptance of new testing technologies, cost of facility approval or operation.	Yes	*[Please move to Section 3.4]*
		No	*[Please supply detail, including estimated economic impact of the issues experienced]*
3.3	Is there an offshore facility that you would like to use that is not yet approved?	Yes	*[Please supply detail, including whether a request for approval of the facility has been made].*
		No	*[Please move to Section 3.4]*
3.4	Please provide any comments on offshore quarantine facilities that you feel may be relevant to this study.		

Section 4: Other issues

Please provide comment on any other regulatory barriers you are facing on the importation of germplasm material (noting that the scope of this study does not

include new organisms), e.g. EPA issues, PVR issues

Thank you for your input into this survey, please return your completed survey to nikki@solutionz.co.nz before **Friday 6th June 2014**

Appendix 2: GERMAC Working Group Proposal: Review of current and new testing technologies relating to costs in PEQ (9 September 2011)

The GERMAC working group is reviewing costs associated with the importation of plant germplasm under the current Post-Entry Quarantine (PEQ) system. One significant aspect of cost reduction may result from a review of current and new testing methods and technologies available for the detection of plant pests and diseases associated with imported plant germplasm. In addition, procedural activities in the way plant material is collected and tested should also be considered and may provide significant opportunities for cost reductions.

Background

There are a number of tests traditionally used by various disciplines to test for plant pests and diseases. These tests have been well used in plant pathology over the past 40 or so years. Plant virology has traditionally used electron microscopy and antibody based tests such as ELISA to identify disease-causing agents. These techniques require users with a relatively high level of expertise and experience. Observation on spores and colony morphology, virus particles under the microscope, or looking at symptoms on indicators, all require highly skilled personnel for accurate identifications.

Herbaceous indexing and woody indexing are two techniques also used to attempt transmission of virus or virus-like agents from the infected host to indicator plants to look for symptoms that may give an indication of the disease-causing agents. In plant virology the herbaceous indexing and graft indexing tests for viruses take numerous weeks and sometimes even months to complete (e.g. strawberry – 3 months, apple – 2 years). Another limitation with biological indexing is that the symptoms may not identify what specific pathogen is present without additional testing.

Since the mid-1980's when the polymerase chain reaction (PCR) test was developed and being actively used, molecular biology has allowed diagnosticians to develop tests that are generally faster, more specific and more sensitive. In addition, an increasing number of tests are becoming available and new sequence data is continually being generated and deposited in national databases.

The past 10 or more years has seen some new testing techniques become more widely available that play a role in diagnostics. These technologies fall into two categories: those that are used more for specific detection of a specific species or genera (these being real-time PCR, RPA technology and LAMP), and those which are more universal methods best applied for detection of a range of organisms (DNA barcoding, Next Generation Sequencing and siRNA).

There are a number of issues surrounding the use of new and emerging technologies such as RPA, DNA barcoding and next generation sequencing. These new technologies are currently very expensive to implement. They also have the ability to identify micro-organisms present in plant material that may not cause any disease in any crop. If new organisms are found, the HSNO Act would come into force and the plant material is likely to require holding in PEQ for an indeterminable time period with subsequent incurred costs. The working group felt that these technologies were suitable for research purposes, but were currently not suitable for routine PEQ testing. In addition, the identification of any new organisms has the potential to negatively impact on market access.

The current import requirements for plant germplasm are defined in the Import Health Standards for Nursery Stock and Seed for Sowing. Imported germplasm associated with high value crops require either Level 2 or 3 PEQ and undergo a pre-determined testing regime prior to clearance. The pre-determined tests which are required in PEQ are specified in MAF's import health standards, and detailed on the import permit. To ensure that latent infections are detected, the tests are mandatory and must be done irrespective of whether the plants appear diseased.

The length of time that imports spend in PEQ is considered a significant factor in the costs associated with importing germplasm as it extends holding costs associated with the PEQ facility, and delays the ability to grow and/or multiply plants in the field and potentially gain revenue after biosecurity clearance. In certain instances, the length of time in PEQ is extended beyond the specified period due to the type of testing (e.g. biological indexing) and waiting for the most optimal time for testing (e.g. spring).

Germplasm importers often choose to source material from offshore MAF-accredited facilities where a significant amount of testing has been performed offshore to reduce the time and testing in PEQ in New Zealand. However, there are a limited number of current MAF-accredited facilities and often it is more practical to source material from elsewhere and perform all testing in a Level 3 PEQ facility in New Zealand.

MAF's Plant Health and Environment Laboratory (PHEL) develops PEQ testing manuals, describing the materials and methods used to test for pests and diseases in quarantine, based on the requirements prescribed in the import health standard.

However, due to limited time and resources, various groups within MAF can find it difficult to continuously update all the relevant import requirements, regulated organisms of concern, and available cost-effective testing methods. The updating of these requirements occurs within a dynamic international context where new, more cost-effective tests and technologies are being identified constantly, and where research on regulated and high impact pathogens is also being reviewed and updated frequently.

A number of examples, which show potential to result in significant savings to importers and industry, require further research and refinement in order to provide cost-effective methods for importing pest-free germplasm to meet New Zealand's import health standard requirements:

- **Direct testing of tissue culture plant material:** MAF's Plant Health & Environmental Laboratory (PHEL) has shown that direct testing of tissue cultures for certain virus, bacteria and phytoplasmas was comparable to testing the same material that has been grown under glasshouse conditions for 6 months prior. This research needs to be peer reviewed and published, but it shows promise for allowing a potential reduction of costs through material being tested directly and released, or testing and perhaps allowing to be grown in a lower level of PEQ should the material test negative. The working group recommends that this work be published in a peer reviewed journal and passed to the GERMAC working group for review and to provide recommendations to MAF for possible implementation.
- ***In vitro* shoot tip grafting:** For one high value crop, *Citrus*, *in vitro* shoot tip grafting has been shown to potentially eliminate all regulated plant pathogens. It could be cheaper to import germplasm, perform *in vitro* shoot tip grafting onto healthy rootstocks and perhaps grow in lower level of PEQ with subsequent testing for some regulated pathogens. This technology would require further research and validation for each individual crop (and possibly cultivar) before being suitable for use in PEQ without increasing the biosecurity risk. The current EPA regulations make it difficult to conduct this type of research in New Zealand.

- **Thermo/chemotherapy:** Involves performing virus elimination through thermo/chemotherapy techniques directly on imported *in vitro* germplasm and allowing material to be deflasked and perhaps grown in lower level of PEQ with subsequent testing for some regulated pathogens. However, this research would need to be validated for each new crop and possibly differing cultivars that were to be imported into NZ. This technique could only be used where the unwanted microorganism was not transmissible through pollen or air borne (e.g. nepoviruses, fungi, bacteria). Whilst this technique may allow material to be processed through a lower level of PEQ, it could also significantly increase the time material would be in PEQ.
- **Bulking of test samples:** The ability to detect a virus in a single sample by PCR or ELISA is considered the same as the ability to detect a single infection in a bulked sample of five. This is currently being used in PEQ testing where the five samples are derived from a single plant. The working group proposes reviewing and/or conducting research to allow bulking into lots of 5 from the same mother plant, cultivar or species. MAF is currently putting together a paper to discuss the this issue.
- **Tiered PEQ system:** The working group propose investigating the option of instigating a tiered PEQ system where possible. For example, this is the current practice of PEQ in USA for Summerfruit and Pipfruit imports. Under this regime, material will be imported into Level 3 (or Level 2 via an MAF-accredited offshore facility). Once the material has completed all molecular and herbaceous indexing and been shown to be free from unwanted organisms, the material could then be transferred to a Level 1 PEQ whilst the woody indexing is completed over the subsequent two year period. This system would significantly reduce the costs in Level 2 & 3 PEQ and allow for bulking up of plant propagative material whilst in Level 1.
- **Testing of Bacteria and Fungi in Level 3 PEQ:** Currently, the IHS requires the testing of non-symptomatic plant material for bacteria and fungi. This is currently carried out by plating non-symptomatic plant material onto PDA or Bacterial agar. The ability to detect an unwanted pathogen in this manner is considered very low. The working group propose that an investigation should be made into imposing environmental growing conditions on plants whilst in L3 PEQ that are conducive to disease expression of bacteria or fungi. This would reduce the costs in testing (e.g. eliminate PDA plating etc) and increase the possibility of detecting endophytic bacteria or fungi that are hitchhiking on the imported material. Under the current regime, disease expression is very low due to the plants being grown under non-disease inducing environmental conditions (i.e. no disease infection periods). The working group would like to investigate this option further as a way to reduce Level 3 PEQ costs and to also reduce overall biosecurity risk.

Proposed development of testing working group

This proposal recommends the development of a technical working group to provide support to MAF in identifying and investigating areas of review where possible to the import testing requirements, such as in areas cited above. The working group will be made up of representatives from MAF (Plant Imports and PHEL), and other testing providers and technical or industry experts.

The technical working group will:

- Aim to support the functions of MAF in developing cost-effective IHS testing requirements to effectively manage the biosecurity risks posed by the importation of high value crop germplasm, in a way that is consistent with New Zealand's domestic legislation and international obligations.
- Identify focus areas relevant to industry where it may be possible to either provide new cost-effective testing techniques or reduce the level of testing and costs to be performed in New Zealand without compromising biosecurity risk management. This may include identifying areas where specific testing and other procedures can be performed to shorten the timeframe required for PEQ in New Zealand, or to result in a lower level of PEQ (e.g. Level 1) being required prior to biosecurity clearance being given.

- Engage with MAF in the development of a clear policy for the bulking of leaf material samples for serological and molecular testing which will ensure that sample bulking is undertaken in a transparent manner and may result in the reduction of costs to importers & industry in certain situations.
- Identify other areas associated with testing procedures for development or review that may result in the reduction of costs to importers & industry (e.g. direct testing of tissue culture material, testing of bacteria/fungi, as cited above).

The testing technical working group will meet and/or engage regularly to discuss focus areas and to formulate project plans and recommendations, where required, for consideration by MAF, or other industry or research agencies.

The review of import testing requirements will be limited to high value crops significant to New Zealand (e.g. *Prunus, Malus, Vitis, Actinidia, Solanum, Pyrus, Citrus* etc.).

Working group output / service requirements

1. A working paper will be initially drafted by MAF on the bulking of leaf material samples and passed on to the GERMAC technical working group for specific discussion and review. The technical working group will provide formal comments and recommendations to MAF on the working paper. This will form part of a wider consultation with importers and industry on the proposed sample bulking policy.
2. Formulate project plans on the development of new or improved testing techniques, where required, for consideration and potential implementation by MAF or external individuals, industries or research agencies. This may involve organising additional resourcing to MAF or other research agencies, where necessary, to support the development of new cost-effective testing techniques.
3. Provide recommendations to MAF on specific areas relevant to industry where it may be possible to provide improved cost-effective testing techniques or procedures without compromising biosecurity risk management.

Barriers/risks

- There is the potential for a conflict of interest between MAF representatives on the technical working group and their role in exercising the regulatory functions of MAF.
- There may be few recommendations possible by the technical working group due to the expected costs of developing new or improved testing techniques outweighing the benefits to importers and industry in the short term.
- Some stakeholder groups may be concerned that the working group will propose reduced stringency of PEQ testing requirements to meet biosecurity outcomes.